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Caribbeanomics: Assessing the Effectiveness of U.S. Foreign Aid in the English-speaking Caribbean

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Caribbeanomics

Assessing the Effectiveness of U.S. Foreign Aid in the English-speaking Caribbean

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ABSTRACT

This paper aims to investigate the impact of U.S. foreign assistance in the English-speaking Caribbean utilizing a sample of 4 islands (The Bahamas, Barbados, Jamaica, and Trinidad and Tobago) over the period 2001-2016. This research employs fixed-effects and time fixed effects panel OLS regression models to predict HDI scores as proxies for holistic human development. The models, constructed with a 1 year lag, find that per capita total aid has a weak, negative, statistically insignificant impact on HDI, but a negative, statistically significant effect on the income component of HDI. Regardless, we find that on average, a \$1000 increase in aid per capita is associated with a 0.132 unit decrease in predicted normalized HDI score. The results suggest that foreign aid could be hurting these Caribbean islands and that perhaps policy makers should direct a larger proportion of total aid disbursements towards more long-run drivers of HDI dealing primarily with educational attainment, economic wellbeing, and life expectancy.

Keywords: Total Aid per capita; HDI; Human Development; English-speaking Caribbean; U.S. Foreign Aid

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Introduction:

The United States disburses financial aid to Caribbean countries in order to advance the U.S.'s strategic interests in the region, which change along with shifts in U.S. foreign policies. Currently, U.S. funds to Caribbean economies reflect the diverse needs of each nation ranging from assistance with political, security, and socioeconomic challenges, to strengthening democratic influences in some cases. Furthermore, the primary channel through which aid is disbursed to the Caribbean is the U.S. Agency for International Development (USAID), which divides its funds into several categories, namely: peace and security, democracy, human rights, and governance, health, education and social services, economic development, environment, humanitarian assistance, program management, and multi-sector projects (Meyer, 2018).

Moreover, prior to 2015, U.S. foreign assistance strategies have followed the frameworks highlighted in the United Nations' Millennium Development Goals (MDGs), which dealt with alleviating humanitarian concerns. The goals set forth by the UN ranged from halving extreme poverty to guaranteeing universal primary education to eradicating the spread of HIV/AIDs by 2015.

However, under the Trump Administration, the U.S. is reassessing its foreign aid initiatives within the Caribbean region in terms of transitioning from traditional forms of development aid into strategic initiatives in the hopes of establishing bilateral engagements. Meyer (2018) posits that the decision of the U.S. to decrease funding to the region since FY2011 can be attributed not only to overall foreign assistance budget cuts, but also to improving levels of economic growth as well as the implementation of more robust social policies. Already, from

FY2017¹ to FY2018, U.S. financial assistance to Latin America and the Caribbean has declined by 36% from \$1.7 billion to \$617 million. Therefore it is unsurprising that U.S. financial aid to Latin America and the Caribbean is declining at a faster rate than in any other region in the world since 2016 (Meyer, 2018). It is illuminating to observe the trends observed in Figures 1 and 2, which expose that while overall aid disbursements to the region are in fact declining, this does not seem to be the case for all islands.

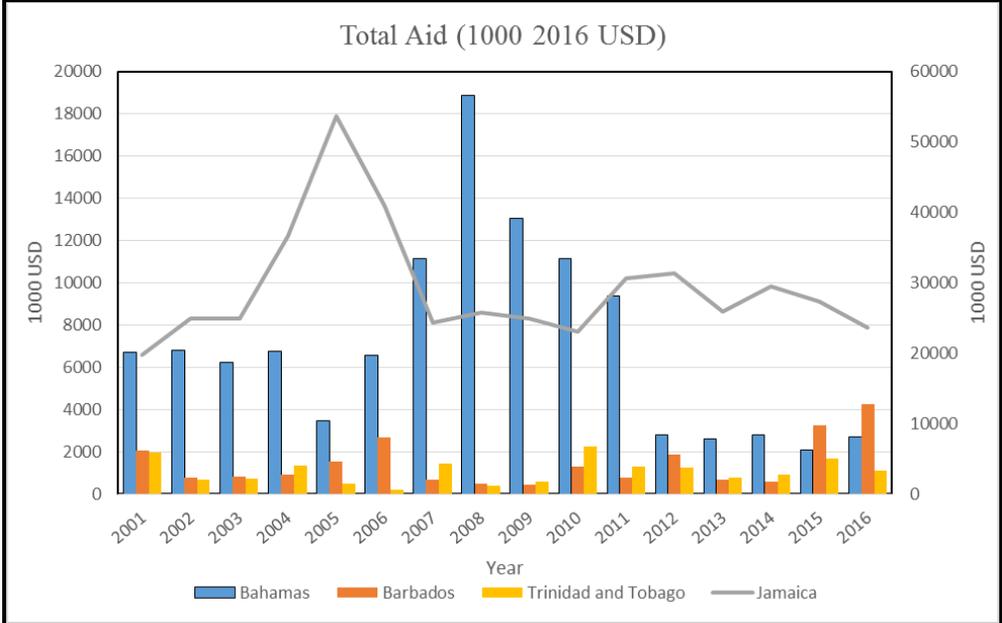


Figure 1: Total U.S. Foreign Aid by Country in \$1000s, The Bahamas, Barbados, Jamaica, Trinidad and Tobago 2001-2016

As observed in Figure 2, for islands such as Trinidad and Tobago and Barbados, aid disbursements have fluctuated dramatically from 2001 through 2016, which is not initially apparent when comparing Figures 1 and 2. These shifts in foreign assistance can lend perspective

¹ The abbreviation ‘FY’ as used by Meyer (2018), refers to ‘Fiscal Year.’

to this research by positing that perhaps different countries respond to socio-economic shocks in different ways, and are granted aid accordingly.

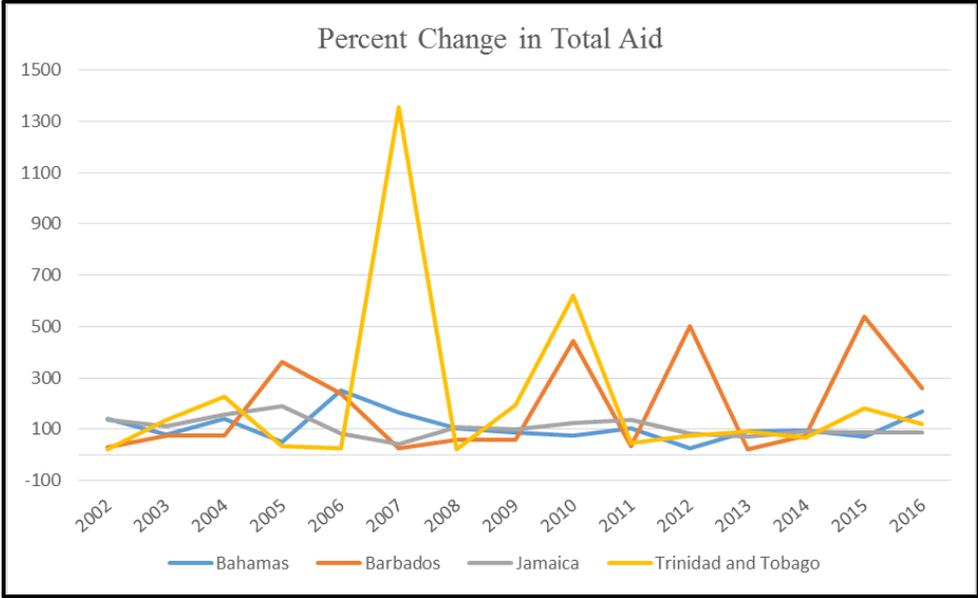


Figure 2: Change in Total U.S. Foreign Aid by Country (%), The Bahamas, Barbados, Jamaica, Trinidad and Tobago 2001-2016

Previous studies have investigated the socio-economic impacts of foreign aid in developing, less-developed, and underdeveloped nations, as well as in Latin America and the Caribbean. However, little scholarly research was found on assessing the effectiveness of foreign aid by predicting Human Development Index (HDI) values, and even less was found on economic studies examining English-speaking Caribbean countries. The purpose of this paper will be to analyze the impact of U.S. foreign aid on English-speaking Caribbean countries by investigating a sample of the 4 of these nations which receive the most U.S. foreign assistance. These countries are: the Bahamas, Barbados, Jamaica, and Trinidad and Tobago. This research is important because it is possible that the socio-economic impact of U.S. foreign aid is not as

profound as previous literature suggests in the English-speaking Caribbean. Additionally, there may be previously unobserved factors influencing HDI that can be uncovered through this research that may provide clearer insights into future aid allocation strategies to this region. By utilizing the HDI and its components, which encompasses both social and economic metrics, it is hoped that the impact of U.S. foreign assistance can be captured more holistically. It is instructive to note that despite steadily increasing levels of HDI, seen in Figure 3 below, total aid disbursements to each country show significant variations. This observation suggests that there is valuable knowledge to be uncovered by investigating this discrepancy, which at first is not apparent.

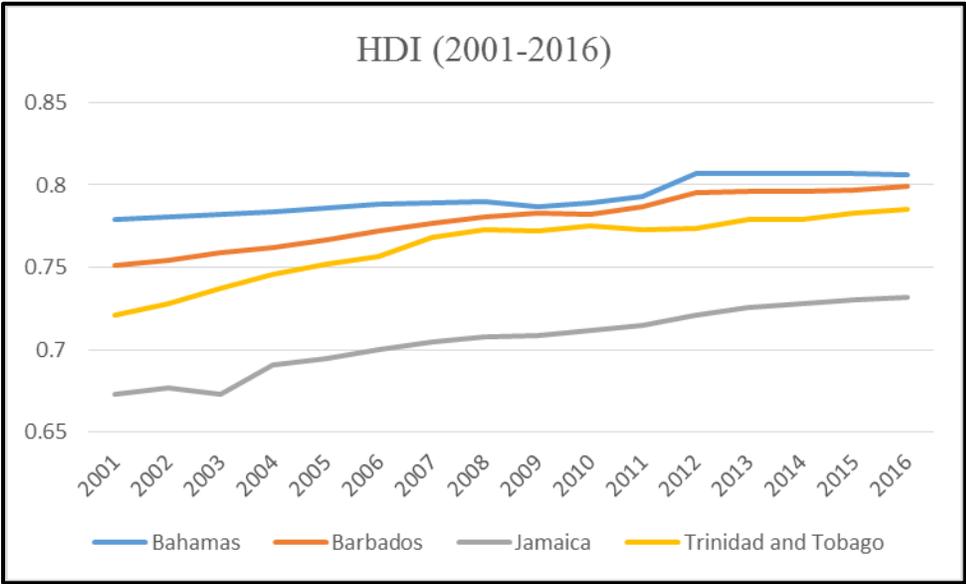


Figure 3: Human Development Index by Country, The Bahamas, Barbados, Jamaica, Trinidad and Tobago 2001-2016

To assess the relationship being examined in this paper, Ordinary Least Squares (OLS) panel regressions are employed, and unobservables are included using country and time fixed

effects. The results of this study indicate that U.S. foreign aid and human development share a small, negative, but statistically insignificant relationship. However, when considering the impact of foreign aid on the components of HDI, it is insightful that aid has a negative, statistically significant impact on the GNI index. Overall, declines in maternal mortality and HIV/AIDS rates, increasing tax revenues, and other unobservable variables seem to be the true influencers of human development and could be crowding out the impact of foreign aid on the islands in the sample.

Following a literature review, the data and methodology are presented, followed by a discussion of the results. The paper ends with a brief conclusion, potential policy recommendations, and areas for further research related to this topic.

Literature Review:

Previous literature on the impacts of U.S. foreign aid on developing, less developed, and underdeveloped countries have yielded a wide range of findings. For instance, Ekanayake (2010) draws on the research of Papanek (1973) and other scholars², who conclude in their research that foreign aid has a positive impact on growth in less-developed countries. However, researchers such as Burnside and Dollar (2000) and Brautigam and Knack (2004) suggest a negative impact, and others like Mosley (1980) have found that foreign aid exerts no impact on economic growth³. For the purpose of this research, it is crucial to acknowledge the presence of some type of impact exerted by foreign aid on the countries being investigated in the sample.

² Dowling and Hiemenz (1982), Gupta and Islam (1983), Hansen and Tarp (2000), Burnside and Dollar (2000), Gomanee, et al. (2003), Dalgaard et al. (2004), and Karras (2006)

³ Mosley, et al. (1987), Boone (1994), and Jensen and Paldam (2003)

However, it is essential to firstly, define foreign aid, and to examine its true purpose within the Caribbean region. Brunton (2000) of the Caribbean Development Bank, defines foreign aid, commonly known as official development assistance (ODA), as any grant, form of debt forgiveness, or concessional loan which is composed of a grant component of at least 25%, which comes from the government of a developed country and its multilateral agencies. The same source argues that the economic rationale behind foreign aid is to bridge the savings and foreign exchange gaps in underdeveloped countries to promote the levels of domestic savings and investments necessary to attain sustainable economic growth.

This research paper however, aims to enhance the perspective of Brunton (2000) by exploring the effectiveness of U.S. foreign aid not only in achieving economic growth, but also in aligning developing economies with the socio-economic framework provided by the United Nations' Millennium Development Goals (MDGs), which deal with humanitarian indicators of development, as well as the Trump Administration's proposed agenda of addressing U.S. domestic concerns in the region such as irregular migration and transnational crime. Bermeo and Leblang (2015) actually posit that foreign aid is utilized by donor countries in the context of a wider immigration strategy to decrease the push factors which spur migration by facilitating economic development in developing countries. Furthermore, Kandemir (2012) posits that income, education, and health remain the primary causes of migration, which adds relevance to my research which will explore whether or not foreign aid is offering any assistance to these socio-economic concerns.

With regards to trends in U.S. foreign aid data, Brunton (2000) states that the rate of decline in foreign aid to the Caribbean is the fastest than that of any other region in the world. Therefore, it is crucial to contextualize this research in the context of declining aid inflows.

In light of Brunton's findings, Niyonkuru (2016) purports that foreign aid acts as a form of economic exploitation which deteriorates the economies of developing nations and serve only as short term interventions which lack any sustainable impact. Niyonkuru argues that the volatile and unpredictable nature of aid, exacerbated by corruption and mismanagement inherent in the bureaucracy, delays progress on existing projects and initiatives, which hampers the possibility of any long-term impact. Additionally, McGillivray et al. (2001) state that while foreign aid can increase access to social services and amenities like education and healthcare, it does not improve the quality or quantity of these facilities. As a result, poverty is stabilized but not alleviated due to the lagging nature of aid. Consequently, according to Lipton, Toye and Cassen (1986), foreign aid may be ineffective in reaching needy populations, which underscores Niyonkuru's notion of aid mismanagement.

Socio-economic and historical intuition supports the investigation of the relationships between politics, the economy, and foreign financial assistance. Svensson (2000), and Djankov et al. (2008) argue that foreign aid affects the democratic stances of political systems within developing countries, and leads to an increase in government expenditure and a reduction in investment, which slows economic growth. Furthering the discussion of the political impact of foreign aid, Young and Sheehan (2014) conclude that foreign aid hampers economic growth due to deteriorations in developing nations' legal systems and property rights frameworks, as well as their international trade freedoms. Notwithstanding, Boone (1994) makes the claim that the disconnection between a nation's policies and aid which it receives mainly serve the donor's interests rather than the needs of the recipient. Slusher and Blackman (2000) delve more deeply into the role of the donor in shaping the impact of foreign aid by concluding that donor coordination is essential for aid effectiveness due to the limited institutional capacities of some

developing countries, and that the lack of donor coordination results in high aid transaction costs and a decreasing positive impact.

Economic theory suggests that the impacts of foreign aid on the economy are primarily attributed to fiscal and budgetary changes, which affect investment, taxes, and government expenditure. White (1993) supports this economic notion by stating that aid can result in not only an increase in taxes, as well as an increase in government expenditure, exceeding the value of the aid inflow, but also a decline in national income. Furthermore, McGillivray et al. (2006), highlight the ineffectiveness of foreign aid by suggesting that it has decreasing economic returns, is subject to external, climactic, and political conditions, and is influenced by institutional quality. This finding is supported by Easterly and Pfitze (2008) who argue that among others, certain types of aid tend to be insignificant to growth and development, namely tied aid, food aid, and technical assistance, the most relevant components to my research being technical assistance.

Conversely, it can also be argued that foreign aid is beneficial to developing countries. From an economic standpoint, Tsikata (1999) posits that there is a positive relationship between aid and domestic savings and investment given that policy adjustment efforts are sustained, which somewhat mirrors the word of Boone (1994). Feyzioglu, Swaroop, and Zhu (1998) have also found similar positive relationships between aid and public investment in their study which utilized a sample of 14 developing countries over a 20 year period.

In a similar vein, Morrissey (2001) indicates that foreign aid can result in economic growth not only through increases in investment, but also through: increasing physical and human capital, amplifying the country's capacity to import technology and capital goods, and facilitating the transfer of technology thereby spurring the productivity of capital and

encouraging “endogenous technical change.” This finding is underscored by a study completed by Karras (2006) on a sample of 71 aid-receiving developing economies which concluded that foreign aid has a positive, permanent, and statistically significant impact on economic growth, and that on average, a per capita increase in aid by \$20 is associated with a permanent 0.16% increase in that country’s real GDP growth rate, not accounting for the effects of country-specific policies.

Bauer (1981) supports Morrissey and Karras by arguing that foreign financial assistance fosters economic development, reduces poverty, and facilitates income redistribution. He enhances these findings by stating that financial aid assists in fixing past economic mistakes, as well as acts as a population control measure among others. Similarly, White (1993), in contrast to his prior notions, posits that foreign financial aid translates into higher incomes, and as a result, higher levels of domestic savings, and that the crowding out of private investment by aid can actually reduce taxes. In summary, White finds that the impact of aid on economic variables depends heavily upon each country’s relationship between aid inflows and private investment. Gomanee et al. (2005) reinforce White’s conclusions in their empirical study which suggests that aid has a positive impact on developing economies through increases in investment. Furthermore, Farah et al. (2018) find that increases in foreign aid encourage foreign direct investment (FDI), which is likely to create jobs and lead to a decline in unemployment.

Regarding the social aspect of this relationship, Burnside and Dollar (1998) have found that economic growth is followed by improvements, though not as profound as those in growth, in social indicators like poverty rates, measured by infant mortality, within the framework of a “good policy environment.” This is an essential finding to my research as several social indicators, including health-related variables dealing with infant mortality and HIV/AIDS rates

will be considered. Testing these factors will be of immense importance when considering the work of Veillette, Ribando, and Sullivan (2006), who report that Trinidad and Tobago and Barbados have some of the highest HIV infection rates in the Caribbean, with rates of 3.2% for the former and over 1% for the latter, which is high considering the vulnerability of small island developing states to contagious diseases.

To summarize, evidence on foreign financial assistance concludes that aid has socio-economic impacts on developing countries. Economic findings suggest that foreign aid can result in changes in investment, taxes, government expenditure, income, and unemployment. Furthermore, research indicates that the effects of foreign aid can be observed through social institutions such as the legal, education, healthcare, and political systems among others. Therefore, my research follows the premise that there are both positive and negative effects of U.S. foreign financial aid on socio-economic development in developing countries and seeks to disprove the notion that aid and development are uncorrelated.

Data and Methodology:

Basic summary statistics, namely, means, medians, maximums, minimums, standard deviations, labels, and descriptions of the data can be found in Table 1. It is particularly important to note that while the sample consists of countries which have relatively close per capita Gross Domestic Products (GDPs) as seen in Appendix 1, Figure 1, there are pronounced disparities across several of the variables used in the study⁴, which may provide useful insights in the discussion of the results. In order to capture fluctuations in HDI values across different

⁴ Significant disparities can be observed in the Standard Deviation column in Table 1

islands over time, a panel dataset was utilized. The sample included the 4 English-speaking Caribbean countries which receive the highest annual amounts of U.S. aid namely the Bahamas, Barbados, Jamaica, and Trinidad and Tobago. These 4 developing nations share similar socio-economic conditions, as well as social, financial, and political ties. Thus, the choice to limit the data to these 4 islands allows for more accurate generalizations not only regarding English-speaking Caribbean nations but also small, developing nations. Moreover, the choice to employ HDI as the key variable of interest was based on its ability to encapsulate human development in both social and economic spheres. Separating the HDI into its primary components also allowed for further analyses of the impact of foreign assistance on health, education, and income respectively.

The HDI score aims to cover 3 broad dimensions, namely a long and healthy life, knowledge, and a decent standard of living. These dimensions are captured utilizing 4 key metrics: life expectancy at birth, the mean and expected years of schooling, and the Gross National Income (GNI) per capita (PPP \$). These indicators are then quantified in 3 indices: the life expectancy, education, and GNI indices, which form the HDI index⁵. GDP per capita was not included as an independent variable as theoretically, GDP should be equal to GNI for any given year under the economic assumption that all goods produced within a country will be consumed. The decision to use HDI as the dependent variable resulted in all independent variables being modeled using a 1 year lag⁶, which was selected among 1-4 year lags by the significance of each model. This strategy seemed necessary as HDI may not be an effective predictor of short-term growth because the literacy and mortality components of HDI are not as quickly impacted by

⁵ HDI calculations can be found in Appendix 1.

⁶ Davies (n.d.) in his paper investigating HDI and the Optimal Size of Government models his variables using a 1 year lag to account for the time taken to observe changes in literacy and life expectancy respectively.

socio-economic changes as is the economic component. However, the surprising significance of the 1 year lag over the 2, 3, and 4 year lags respectively could be attributed to limitations in the calculation of the HDI. Moreover, the HDI index and its components were normalized by multiplying its values by 100 for ease of interpretation.

To analyze the holistic impact of U.S. foreign aid on HDI and its composite indices, controls were utilized for both economic and social variables. The control datasets were all obtained from World Bank Open Data. The key variable in this study was constructed by calculating the amount of per capita total aid disbursed per year to each island in constant 2016 U.S. dollars. This dataset was collected from the USAID International Aid Transparency Initiative (IATI). This allowed the models to assume consistency in the distribution of foreign aid across each population. It was expected that increases in per capita U.S. aid disbursements would spur overall socio-economic growth, and lead to improvements in standards of living, which would be reflected in a higher HDI score. Moreover, an interaction term was constructed that could assess the effectiveness of U.S. financial assistance for years in which an increase in aid was recorded. While the same impact of total aid per capita was anticipated, this interaction term was intended to investigate the current Administration's hypothesis that economic growth provided a suitable basis for decreasing aid disbursements to the region.

To control for the impacts of economic growth factors on human development, unemployment rates, tax revenues as percentages of GDP, net Foreign Direct Investment (FDI) inflows, and international tourism receipts were included. It was expected that a control for unemployment would show an inverse relationship between job creation rates and HDI, as more jobs would result in higher levels of consumption, leading to economic growth, and render the population more capable of attaining higher standards of living, and access to healthcare and

education. The latter 3 economic variables were expected to have a positive relationship with predicted HDI scores. Increasing amounts of foreign capital injections, as well as tourist dollars coming into each island, was thought to promote higher levels of productivity, technology, training, environmental sustainability, and employment in relevant sectors. Furthermore, it was thought that increases in tax revenues to local governments would signal an increase in nationwide employment rates as it indicates that fewer people are receiving assistance through social security safety nets and that more people are earning taxable incomes and are therefore able to pay taxes.

Additionally, controls for social indicators of development proved useful in examining the direct relationship between U.S. foreign aid and HDI. The intentional homicide and maternal mortality rates per 100,000 people, the rate of HIV prevalence, as well as the annual net migrations were employed in the models. It was predicted that intentional homicide, maternal mortality, and HIV prevalence figures would show inverse relationships with HDI scores by indicating poor levels of national security and healthcare. However, it was expected that an increase in net migrations would indicate that push factors spurring migration are declining, and that pull factors attracting labor to the Caribbean are growing, resulting in higher predicted HDI scores.⁷

⁷ Kandemir (2012) suggests that foreign aid may be a strategy employed by donor countries to address the push factors that spur migration from developing countries.

Table 1: Sample Summary Statistics

| Variable | Units | Mean | St.Dev | Min | Max |
|-----------------------|------------------|-------------|---------------|------------|------------|
| HDI | Units | 75.995 | 3.716 | 67.3 | 80.7 |
| Life expectancy Index | Units | 81.927 | 3.599 | 74.7 | 86.1 |
| Educational Index | Units | 69.653 | 4.729 | 56.9 | 77.7 |
| GNI Index | Units | 77.281 | 7.508 | 65.3 | 86.4 |
| Aid per capita | 2016 USD | 9.271 | 10.211 | 0.158 | 54.055 |
| Homicides | Per 100K people | 27.039 | 15.227 | 6.823 | 60.991 |
| Maternal Mortality | Per 100K people | 66.927 | 21.299 | 27 | 93 |
| Net Migration | People | -21500 | 39866.21 | -93096 | 15483 |
| HIV | % of population | 1.684 | 0.633 | 0.5 | 2.8 |
| Tourism | Current USD | 43.299 | 23.685 | 2.848 | 77.856 |
| Unemployment | % of labor force | 10.057 | 3.23 | 3.31 | 16.18 |
| Tax revenues | % of GDP | 21.516 | 6.276 | 8.999 | 30.258 |
| FDI | Current USD | 4.66e+08 | 5.63e+08 | -1.90e+09 | 2.80e+09 |
| N | | 64 | 64 | 64 | 64 |

In order to capture the effect that U.S. foreign aid may have on human development within specific islands, a Fixed-Effects (FE) panel estimation is employed.⁸ Utilizing this strategy, some potentially unobservable differences specifically demographic and socio-economic differences, which are country-specific, can be statistically addressed. Furthermore, time fixed-effects are employed to expose time trends excluded by the chosen variables as well as those caused by statistically obscure phenomena such as cultural and ideological shifts. For instance, HDI scores rise over time for each island as illustrated in Figure 3, while the prevalence of HIV inherently falls, which makes sense in the context of heightened sexual awareness, and increased sex education and access to preventative methods.

To ensure that an FE estimator is in fact more suitable than is a Random-Effects (RE) estimator for dealing with cross-sectional endogeneity in this study, a Hausman test is run. This test confirmed that the independent effects are correlated with the independent variables, which

⁸ Davies (n.d.) utilizes a fixed-effects panel model to study HDI among several countries across time.

is intuitive given the interrelatedness of social wellbeing and economic growth. This is evident through the observation of a significant p-value ($\chi^2(3) = 23.64$ and $\text{prob} > \chi^2 = 0.000$), and was expected due to the nature of panel data. Additionally, shocks in one island in the sample are likely to be experienced to some degree by the others due to geographic proximity and close economic ties, which foreshadowed the need for FE estimators. Thus, FE estimators were chosen over RE estimators for this research.

Moreover, to confirm that time fixed-effects are necessary to address inherent time trends across countries, a Wald test is run. The statistically significant p-value ($F(14, 32) = 24.72$ and $\text{prob} > F = 0.000$) indicated that this was the case. This result was unsurprising as it is expected that the variables included in this paper are all subject to extraneous factors produced over time. By running the models used in the FE regression analysis with time fixed-effects, it is hoped that some of these unobservable trends can be uncovered.

The initial regression analysis will focus on utilizing FE and time FE estimators to investigate the effect of U.S. foreign aid on HDI. These variables include: total aid per capita, maternal mortality, net migration, international tourism receipts, unemployment, tax revenues, and FDI. Furthermore, as a response to the UN MDG pertaining to halting the spread of HIV/AIDs, as well as the Trump Administration's proposition to focus on addressing pressing issues like the prevalence of HIV/AIDs in Latin America and the Caribbean, the HIV prevalence variable was added into the model.⁹ Additionally, an interaction term was added by multiplying the dollar increase in aid by 1 if aid increased in that year and 0 if it did not. This strategy was aimed at capturing the effects of years which saw increases in U.S. foreign aid compared to years

⁹ Meyer (2018) mentions the prevalence of relatively high HIV/AIDs rates in the Caribbean, which has resulted in a more direct focus from the current Administration in terms of the foreign aid budget.

during which aid disbursements declined or remained constant. Furthermore, intentional homicide rates per 100,000 people were included as proxies used to measure each island's level of national security over time. The model is represented by the following equation:

$$\begin{aligned}
 HDI_{i,t} = & \beta_0 + \beta_1 Aid\ per\ capita_{i,t} + \beta_2 Maternal\ Mortality_{i,t} + \beta_3 Migration_{i,t} + \\
 & \beta_4 Tourism_{i,t} + \beta_5 Unemployment_{i,t} + \beta_6 Tax\ Revenues_{i,t} + \beta_7 FDI_{i,t} + \beta_8 HIV_{i,t} + \\
 & \beta_9 (Aid\ x\ Total\ Aid\ increase)_{i,t} + \beta_{10} Homicides_{i,t} + \varepsilon_{i,t}
 \end{aligned} \tag{1}$$

Where HDI refers to the normalized HDI score on a scale of 0 to 100 (100 indicating a utopian human development scenario) in country i at time t , while $\varepsilon_{i,t}$ represents the OLS-assumed error term.

As discussed previously, the conclusion of the Wald test necessitated the implementation of year fixed-effects. As a result, the model constructed in Equation 1 was run with the additions of year dummy variables aimed at uncovering any unobserved time trends in the data. The time fixed-effects OLS panel models are illustrated below:

$$\begin{aligned}
 HDI_{i,t} = & \beta_0 + \beta_1 Aid\ per\ capita_{i,t} + \beta_2 Maternal\ Mortality_{i,t} + \beta_3 Migration_{i,t} + \\
 & \beta_4 Tourism_{i,t} + \beta_5 Unemployment_{i,t} + \beta_6 Tax\ Revenues_{i,t} + \beta_7 FDI_{i,t} + \beta_8 HIV_{i,t} + \\
 & \beta_9 (Aid\ x\ Total\ Aid\ increase)_{i,t} + \beta_{10} Homicides_{i,t} + year + \varepsilon_{i,t}
 \end{aligned} \tag{2}$$

Where year refers to the coefficients of each year dummy for each of the 4 countries, which allow for interpretations of the signs and magnitudes of the suspected time trends for each year.

Furthermore, following the previously illustrated models, country clustered robust standard errors were used as a robustness check. This allowed for unbiased standard errors and

coefficients as the results obtained through panel data regression analyses can sometimes be skewed by similarities across clusters, or countries in this case. This check is essential as the clustered nature of panel data makes the sample standard errors more likely to be correlated across clusters which may overstate the precision of the OLS estimators.

Following the regression analyses employing HDI as the dependent variable, the model was run utilizing each of the 3 components of HDI as new dependent variables. This strategy aimed to uncover any influence that foreign aid may be exerting on the dimensions of human development, namely life expectancy, education, and income that may be significant, but not robust enough as to shift the overall index value. These models were run as OLS panel regressions using FE estimators but did not require independent variable lags as each index is calculated using data from only the previous year. The models for each composite index are illustrated below:

$$LEI_{i,t} = \beta_0 + \beta_1 Aid\ per\ capita_{i,t} + \beta_2 Maternal\ Mortality_{i,t} + \beta_3 Migration_{i,t} + \beta_4 Tourism_{i,t} + \beta_5 Unemployment_{i,t} + \beta_6 Tax\ Revenues_{i,t} + \beta_7 FDI_{i,t} + \beta_8 HIV_{i,t} + \beta_9 (Aid\ x\ Total\ Aid\ increase)_{i,t} + \beta_{10} Homicides_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$EI_{i,t} = \beta_0 + \beta_1 Aid\ per\ capita_{i,t} + \beta_2 Maternal\ Mortality_{i,t} + \beta_3 Migration_{i,t} + \beta_4 Tourism_{i,t} + \beta_5 Unemployment_{i,t} + \beta_6 Tax\ Revenues_{i,t} + \beta_7 FDI_{i,t} + \beta_8 HIV_{i,t} + \beta_9 (Aid\ x\ Total\ Aid\ increase)_{i,t} + \beta_{10} Homicides_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$II_{i,t} = \beta_0 + \beta_1 Aid\ per\ capita_{i,t} + \beta_2 Maternal\ Mortality_{i,t} + \beta_3 Migration_{i,t} + \beta_4 Tourism_{i,t} + \beta_5 Unemployment_{i,t} + \beta_6 Tax\ Revenues_{i,t} + \beta_7 FDI_{i,t} + \beta_8 HIV_{i,t} + \beta_9 (Aid\ x\ Total\ Aid\ increase)_{i,t} + \beta_{10} Homicides_{i,t} + \varepsilon_{i,t} \quad (5)$$

Where LEI, EI, and II refer to the normalized Life Expectancy, Educational, and Income Index scores on a scale of 0 to 100 (100 indicating a utopian scenario) in country i at time t , while $\varepsilon_{i,t}$ represents the OLS-assumed error term.

Results:

Table 2: Fixed Effects, Time Fixed Effects, and Time Fixed Effects using Robust Standard Errors OLS Panel Regression Results¹⁰

| | (1) hdi100 | (2) hdi100 | (3) hdi100 |
|-----------------------|---------------------------|--------------------------|--------------------------|
| lagaid_pc1 | -0.000791 (0.0245) | -0.000132 (0.00968) | -0.000132 (0.00795) |
| laghomicides1 | 0.0235 (0.0285) | 0.00633 (0.0117) | 0.00633 (0.00792) |
| lagmaternalmortality1 | -0.261*** (0.0614) | -0.107*** (0.0285) | -0.107** (0.0273) |
| lagnetmigration1 | 0.0000801* (0.0000440) | 0.0000158 (0.0000209) | 0.0000158 (0.0000230) |
| laghiv1 | -4.028*** (1.425) | -1.388** (0.669) | -1.388 (0.908) |
| lagintl1 | -0.104** (0.0490) | 0.00969 (0.0253) | 0.00969 (0.0277) |
| lagunemployment1 | 0.149* (0.0849) | -0.0818* (0.0410) | -0.0818* (0.0275) |
| lagtaxrevpercap1 | 0.590*** (0.124) | 0.144** (0.0533) | 0.144** (0.0253) |

¹⁰ Time FE dummy variables omitted for table brevity. See Appendix 1, Table 1

| | | | |
|----------------------------|--------------------------|-------------------------|-------------------------|
| lagfdi1 | -5.04e-10* (2.76e-10) | 2.44e-10 (1.46e-10) | 2.44e-10 (1.46e-10) |
| lagaidinc1 | -9.94e-09 (1.70e-08) | -4.34e-09 (7.05e-09) | -4.34e-09 (8.70e-09) |
| _cons | 92.24*** (8.459) | 80.70*** (3.969) | 80.70*** (4.491) |
| <i>N</i> | 60 | 60 | 60 |
| <i>R</i> ² | 0.590 | 0.965 | 0.965 |
| adj. <i>R</i> ² | 0.474 | 0.936 | 0.942 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The initial model, which utilizes FE estimators as predictors of HDI shows that U.S. foreign aid disbursements per capita have a small, negative, but statistically insignificant impact on predicted HDI scores. It can be noted that a \$1000 increase in aid per capita is associated with a 0.791 unit decrease in HDI score when controlling for the other social and economic variables included in the model. Additionally, model 1 illustrates that the impact of foreign aid seems to be crowded out by variations in maternal mortality, net migration, and unemployment rates, tax revenues, international tourism receipts, HIV prevalence, and net FDI inflows. This inference could explain the negative coefficient on the aid per capita variable despite rising levels of socioeconomic progress and as a result, HDI scores over time. Furthermore, the negative coefficient on the interaction variable for aid increases, while insignificant, was instructive as it suggested that for years where an increase in total aid disbursed was recorded, HDI scores on average fell by approximately 0.00001 units for every \$1000 in aid. This is in itself, a relevant finding which allowed for a comparison between the long and short-run impacts of U.S. foreign aid in the region.

The healthcare indicators, maternal mortality and HIV rates seemed to be inversely related to HDI, whereas the signs on the tax revenues and net migration variables suggest positive relationships, which were unsurprising findings. However, it was peculiar that the signs on the unemployment variable was positive, and that those on the international tourism receipts, FDI, and aid increase variables were negative, which gave another indication that time fixed effects were necessary.

In order to test for the incidence of an observable time trend in the models, the panel regression shown in model 1 was run using time FE estimators in the forms of year dummy variables as seen in model 2 as well as in Appendix 1, Table 1.

These results were instructive as they suggested that the negative, but still statistically insignificant impact of U.S. foreign aid on HDI was even weaker than was previously deduced. It was observed that a \$1000 increase in aid per capita is associated with a 0.1 unit decrease in normalized HDI score when controlling for the other social and economic variables included in the model. Furthermore, maternal mortality, HIV prevalence, and unemployment rates, tax revenues, and international tourism receipts remained statistically significant, and changes in the signs of the coefficients on the international tourism, unemployment, and FDI reflected more economically intuitive interpretations. It was also noteworthy that the interaction term measuring the impacts of total aid during years which experienced increased funding, while being statistically insignificant, suggested a weak, negative relationship with HDI. Evidently, a \$1000 increase in aid for a particular year resulted in a 0.000004 unit decline in HDI scores, which was a notable finding as it exposed the negative short-run impact of U.S. foreign aid on human development. It also assisted in underscoring the claim that foreign aid increases are proving

detrimental to Caribbean islands despite its harmful impacts being too small to shift the overall HDI value.

Evidently, time trends were apparent in each model indicated by relatively strong positive coefficients as well as statistical significance at the 1% level for the coefficients on each year dummy for 2004 to 2016 as illustrated in Appendix 1, Table 1. It is unsurprising that the coefficients on each year dummy seems to grow over time. This growth suggests that underlying factors might be causing HDI scores to increase each year. This is essential in examining the relationship between foreign aid and human development as it introduces the notion that perhaps there are less apparent factors at play that are absorbing the statistical impact of U.S. aid on HDI than those represented in the models.

As a robustness check of the models, country clustered robust standard errors were employed in order to validate the time FE estimators yielded by the regression as seen in Table 2. By utilizing this strategy, unbiased robust standard errors were obtained. These results were informative as they suggest that the estimators seen in Table 2 are relatively sound predictors of human development. Maternal mortality and unemployment rates, and tax revenues remained significant drivers of HDI while the HIV/AIDS variable lost statistical significance. The aid per capita and total aid increase variables remained statistically insignificant, and retained their relatively small coefficients and negative signs. Thus, the initial claims regarding their positive impacts on HDI seem invalid and it seems possible that foreign aid could be detrimental to overall human development. The credibility of the estimators produced by the models was reinforced by the consistency in the signs and magnitudes of each coefficient utilized in the regression. Despite marginally inflated standard errors in some cases, which are characteristic of robustness checks, these estimators support our prior inferences.

In addition to the regression models, the Pesaran's test of cross-sectional independence, the Modified Wald test for group wise heteroskedasticity, and the Wooldridge test for autocorrelation in panel data were run, all yielding statistically significant p-values of 0.0005, 0.0017, and 0.0010 respectively. However, given the nature of panel data, these results were likely occurrences as the models were expected to show errors due to both cross-sectional and time-series related phenomena.

Table 3: Fixed Effects Component-wise OLS Panel Regression Results

| | (1) lifeexpectancy100 | (2) education100 | (3) income100 |
|-------------------|---------------------------|--------------------------|--------------------------|
| aid_pc | 0.0276 (0.0228) | 0.0715 (0.0473) | -0.0808*** (0.0179) |
| homicides | 0.0163 (0.0273) | 0.0609 (0.0565) | 0.0450** (0.0214) |
| maternalmortality | -0.229*** (0.0581) | -0.593*** (0.121) | -0.0628 (0.0456) |
| netmigration | 0.0000722* (0.0000417) | 0.000123 (0.0000865) | 0.0000533 (0.0000327) |
| hiv | -4.491*** (1.366) | -8.537*** (2.832) | 0.0522 (1.072) |
| intltourism | -0.0940** (0.0441) | -0.183* (0.0915) | -0.0442 (0.0347) |
| unemployment | 0.245*** (0.0790) | 0.240 (0.164) | -0.123* (0.0620) |
| taxrevpercgdp | 0.482*** (0.112) | 0.848*** (0.231) | 0.402*** (0.0876) |
| fdi | -5.53e-10** (2.63e-10) | -9.41e-10* (5.45e-10) | -1.79e-10 (2.06e-10) |
| aidinc | -1.69e-08 (1.60e-08) | -4.25e-08 (3.32e-08) | 1.23e-08 (1.26e-08) |

| | | | |
|----------------------------|---------------------|---------------------|---------------------|
| _cons | 97.28*** (8.028) | 112.0*** (16.65) | 76.59*** (6.304) |
| <i>N</i> | 64 | 64 | 64 |
| <i>R</i> ² | 0.532 | 0.511 | 0.731 |
| adj. <i>R</i> ² | 0.410 | 0.384 | 0.662 |

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Following the regression analysis employing the HDI index as the dependent variable, it was informative to observe the results of the component-wise panel regressions, which measured the impacts of foreign aid on the life expectancy, educational, and GNI indices respectively. It is extremely telling that foreign aid seems to exert a statistically significant negative influence on the GNI index, which validates the claim that foreign aid is potentially harming Caribbean economies despite the statistical insignificance observed in Table 2. On average, it seems that a \$1 increase in aid per capita is associated with a 0.08 unit decrease in normalized GNI index score, which suggests that foreign aid disbursements are primarily harming these countries through depleting employment opportunities and wages, and diminishing earning potentials. It was also instructive that while statistically insignificant, total aid per capita had weak positive relationships with the life expectancy and educational indices respectively, which while somewhat promising, suggests that overall, aid is not having a profound impact on the healthcare or educational systems in these countries, and is instead being either misallocated or simply wasted.

Furthermore, given the statistical significance observed in the maternal mortality, HIV prevalence, international tourism, unemployment, tax revenues, and FDI variables for at least 2 of the component models, it can be inferred that these variables prove more suitable predictors of human development than do per capita foreign aid disbursements. This finding solidifies the

claim that foreign aid, while having a statistically significant negative relationship with the GNI index, does not exert a strong enough influence on any of the 3 indices to have a profound impact on HDI. Thus, foreign aid did not seem effective in improving human development in the region over the sample time period.

Discussion of Results:

In order to assess the effectiveness of U.S. foreign aid in the English-speaking Caribbean, the paper relies on FE and time FE OLS panel regression models. Both the initial FE model as well as the time FE models with and without robust standard errors suggest that U.S. financial aid exerts a weak, negative, statistically insignificant impact on predicted HDI scores. However, the component-wise OLS panel regressions using only FE estimators find that foreign aid has a negative, statistically significant impact on the GNI or income component of HDI, though not one strong enough to shift the overall HDI value.

It seems that the apparent negative impact of per capita variations in aid is being considerably crowded out by several socio-economic variables, namely maternal mortality, net migration, and unemployment rates, tax revenues, international tourism receipts, HIV prevalence, and net FDI inflows. These claims seem valid when the signs and magnitudes of each coefficient are interpreted. It is also evident by analyzing the FE model that increasing aid per capita disbursements remain statistically insignificant, which poses the question of whether potentially positive impacts of U.S. aid over time are being negated by subsequent, perhaps futile increases in aid or misallocated aid disbursements. It seems that the current Administration's plan to cut aid to Latin America and the Caribbean on the bases of sustained economic growth

and more effective social policies may be a viable strategy considering the regression results. Perhaps strong socioeconomic development assisted by unobserved factors such as technological advances and increasing levels of educational attainment have allowed the Caribbean region to combat the negative implications of foreign aid. However, it could also be the case that the net effect of foreign aid on human development is being masked by these aid cuts, meaning that consistent increases in disbursements to the Caribbean in different sectors are needed in order to produce a more profound, visible, and potentially positive impact.

The results suggest that declining maternal mortality and HIV/AIDS rates are indicative of improving healthcare conditions as well as an increasing focus on pre and post-natal care. Perhaps it is also the case that healthcare facilities have been improving across the English-speaking Caribbean and that medical personnel might be paying closer attention to improving women's pregnancy experiences and outcomes. Additionally, it seems that Caribbean countries have been taking steps to ensure sterile hospital environments and to regularize HIV testing and sexual education initiatives, which are in line with the UN MDGs and the current Administration's plans to focus efforts on HIV/AIDS prevention. These variables, particularly maternal mortality, speak directly to the life expectancy component of HDI, which is evident when considering its robust statistical significance observed in model 1 of Table 3. These coefficients seem to exert some of the largest predictive capabilities on HDI scores, and it is easy to believe that they play significant roles in crowding out the true impact that aid may be having on human development, although this seems to be a negative one.

It is telling that these variables remained statistically significant when time fixed-effects were added to the models. These results suggest that perhaps ideological shifts are occurring in the English-speaking Caribbean, especially in terms of sexual awareness, the prevalence and de-

stigmatization of contraceptive methods, and an overall increase in female empowerment and autonomy. This potential conclusion was captured by the significant positive coefficients on the year dummy variables as numerical variables often lack the power to accurately encompass gradual ideological and cultural shifts. These findings would validate the claim that perhaps foreign aid is not a contributing factor towards improvements in the variables that seem to be spurring improving human development levels.

Furthermore, net migration figures showed a positive, statistically significant relationship with HDI under the FE regression model. The positive sign on this coefficient was expected. It was inferred that perhaps if more people are flowing into a particular island than are migrating out, a “brain gain” could be evident whereby skilled labor is entering the Caribbean to pursue increased educational and job opportunities causing HDI to increase.

This phenomenon would indicate that the push factors spurring migration are decreasing and that socio-economic conditions in the Caribbean are proving suitable facilitators for upward social mobility. Increases in HDI under this scenario would most likely be products of a larger value of remittances in foreign denominated dollars and increases in adult literacy. In this case, time FE estimators provide a consistent conclusions. These time adjusted coefficients are also consistent with initial expectations that pull factors encouraging migration into the Caribbean may instead be increasing due to factors that are not controlled for in the models.

By attracting foreign labor, the region would benefit from higher levels of consumption, as well as more diverse skill sets and training opportunities, which would spur economic growth and lead to higher HDI scores. It is simple to see how migratory changes could be exerting a stronger influence on human development than is foreign aid as it is expected to more quickly and directly encourage economic growth.

A similar conclusion can be drawn in the case of the unemployment variable, which experienced a change in signs but maintained statistical significance. Under the FE model, it would seem that perhaps a more competitive job market could be producing rapidly increasing instances of structural unemployment, which would explain higher HDI scores despite increasing unemployment. However, under time fixed-effects, the negative sign observed for unemployment rates seems more intuitive as lower unemployment rates are known to lead to increasing levels of consumption and innovation, and as a result, economic growth.

Next, it was interesting to explore the impact of increasing tax revenues as a percentage of GDP on HDI. This variable remained robust under time fixed-effects and it is simple to see how any potential economic harm caused by foreign aid could be overshadowed by its impact. Increasing tax revenues according to economic reasoning indicates that unemployment is falling, leading to a decline in the proportion of the population needing to rely on social security benefits as more people are earning taxable incomes. Thus, it would be expected that increasing tax revenues would be significant contributors towards economic growth, evidently more so than foreign aid disbursements. This is indicated by the relatively high coefficient on net migration compared to that on aid per capita. It was therefore posited that variations in tax revenues could be soaking up some of the visible effects of U.S. foreign aid on human development.

Furthermore, the international tourism receipts variable experienced both a sign change and a decline in statistical significance under time fixed-effects. Under the second and third models shown in Table 2, it is seen that there is a positive relationship between tourism revenues and HDI, which makes economic sense. Tourists consume local goods and contribute to economic growth, as well as pump foreign denominated dollars into Caribbean economies. Additionally, tourism is known to spur job creation in the Caribbean region which feeds

economic growth, and countries must maintain acceptable environmental conditions, levels of infrastructural development and institutional standards in areas such as healthcare, business development, and national security in order to attract tourism. The time trend may also be absorbing some of the impacts of tourism revenues on human development because it may be capturing the increasing tendencies of foreigners to vacation in places with tropical climates during the fall and winter seasons. It can also be the case that U.S. aid is having a positive impact on the factors which attract tourism in the Caribbean, which would underscore the notion that variations in tourism revenues seem to be contributing to the crowding out of the less-impactful aid per capita variable.

Moreover, analyzing the impact of FDI on HDI scores, a similar case emerges where both a change in the signs as well as in the statistical significance is evident. It seems that the effectiveness of FDI in the Caribbean may be better captured when exploring long-run impacts. The small but positive coefficient of FDI on HDI scores when including year dummies indicates that when controlling for unobserved effects over time which either facilitate the effectiveness of FDI or expose it, the injection of foreign capital into Caribbean economies improves human development. This makes sense in the context of modernization, technological change, increased job training, and shifts in consumption habits over time which result in economic growth. Increases in foreign aid can without a doubt be affecting FDI inflows but this would depend on the reason for the increase or decrease in aid to that country. For instance, an island receiving a high quantity of U.S. aid in response to a national security crisis might not experience high levels of FDI as large multinationals might perceive that country as a dangerous business environment. This uncertainty may be able to explain the surprisingly small coefficient on the FDI variable

across the models. Thus, it is possible that the impact of foreign aid is also being absorbed by the inclusion of FDI inflows.

Moreover, analyzing the models presented in Table 3, it is evident that foreign aid is proving particularly harmful to production and earning capabilities in the region, suggested by the negative sign on the aid variable as well as its statistical significance at the 1% level. It is therefore possible that foreign aid is in fact subjected to decreasing economic returns and is hampering potential economic growth. This makes sense considering previous literary findings which suggest that in the context of corruption, limited institutional capacities, the lack of donor coordination, and aid mismanagement, the unpredictability of aid disbursements delays progress on projects and growth initiatives, fails to reach economically downtrodden populations, and is ultimately unsuccessful in alleviating poverty. It could also be the case that foreign aid could in fact be serving the needs of donor organizations without benefitting the recipient countries in the same manner. It is unsurprising that these factors could contribute to an overall long-run decline in economic wellbeing. However, given the method of HDI calculation, this negative impact does not currently seem to be profound enough to shift the overall index value.

Additionally, the positive although statistically insignificant impact of the aid variable on the life expectancy and educational indices suggest that while perhaps there is the potential for improvement, foreign aid may not currently be exerting a profound impact on social development in the region. It may be plausible that foreign aid has been unable to increase the quality of social services and institutions such as schools and hospitals despite various initiatives which may increase access to them. Given the natures of healthcare and education, sustainability and longevity ought to be emphasized not only in effectively disbursing aid but also in designing fruitful strategies for improvement in the long run. This explanation seems plausible when

considering the cases of corruption and aid mismanagement that may be severely hindering progress on initiatives aimed at facilitating progress in the social sphere.

Overall, it does not seem that foreign aid is responsible for the inherent improvements in the true drivers of HDI in the English-speaking Caribbean. As a result, it may be possible that the socio-economic variables discussed above in addition to time trends within the data could be crowding out the true impact of U.S. foreign assistance on human development. However, it might be safe to say that the true coefficient on total aid per capita is, in fact, negative, and it might be the case that during years when the value of aid disbursements increased, the harmful impact of HDI could not be properly observed in the short run, reflected by the negative coefficients and statistical insignificance. Additionally, it may also be the case that the slight, small-scale increases in HDI scores over time do not provide enough variation to capture the true impact of U.S. foreign aid.

Conclusion:

While research has been conducted on the impacts of foreign assistance on Latin America and the Caribbean, there is little research conducted which focuses on the effectiveness of U.S. foreign aid in the English-speaking Caribbean. This paper undertakes that challenge and finds some intriguing results. First, it appears that U.S. foreign aid while not statistically impactful is negatively correlated with HDI scores. Additionally, it is evident that several primary drivers of human development including maternal mortality rates, the prevalence of HIV/AIDs, and tax revenue percentages seem to offset any impact that foreign assistance may be having on HDI. This is in keeping with previous literature conducted by McGillivray et al. (2001), who suggests

that while aid may be increasing the ease of access to social amenities, it might not be effective in guaranteeing sufficient quantities or qualities of these services. McGillivray's (2006) claim that foreign aid is subject to decreasing economic returns and to extraneous socio-economic, political, and environmental factors may also hold water in this research given its significant negative impact on the GNI component of the HDI. Thus, previous literature supports both the conclusions that foreign aid may be having a negative or not be having as profound of a direct impact as intended, and that time trends play significant roles in explaining macroeconomic phenomenon. It is important to note that while the results suggests the ineffectiveness of U.S. foreign aid, the paper does not deny that perhaps its true potential is not being realized especially in the context of decreasing aid inflows to the region as well as other factors such as corruption and aid mismanagement.

The paper also questions whether U.S. foreign aid is being allocated towards the sectors which would be most responsive to budgetary increases, or which have long-standing histories of being underfunded such as in the cases of healthcare and education spending. By investigating variations in HDI and its components, it can be proposed that the primary components of aid, specifically literacy and life expectancy are not being addressed efficiently by U.S. foreign aid initiatives. Furthermore, the income component of HDI actually seems to be the one that is most severely impacted by foreign aid despite per capita GDPs in the Caribbean experiencing upward trajectories, which seem to be facilitated through unobserved shifts and shocks inherent in the passage of time. Thus, it is possible that when considering economic wellbeing, foreign aid cuts or allocations away from economic spheres may be plausible recommendations. Therefore, an appropriate path for the future of U.S. foreign aid administrators might be to structure financial assistance budgets in manners that strive to facilitate high life expectancy and literacy rates

across all levels of education. This is not to say that economic growth ought to be neglected, especially in light of the Caribbean's history of political corruption, lagging technological development, proportionately low female empowerment, and low exchange rates relative to the U.S. dollar. However, it may be the case that the cumulative impact of foreign aid might be more profound if it more directly addressed long run solutions to achieving economic growth, as well as more humanitarian spheres of development given that the life expectancy and education components seemed to have positive relationships with foreign aid though statistically insignificant.

Future research should aim to uncover unobserved variation captured by drivers of human development that were not included in this paper. Furthermore, it can be the case that the true impact of U.S. foreign aid might be better observed using a longer lag time, as it is definitely possible that the probable benefits of foreign aid are not experienced in the Caribbean until several years have passed. Moreover, it is evident that the Caribbean is a niche region with very specific socio-economic conditions. Therefore, it might prove a fruitful effort for future researchers of the topic to include controls for characteristically Caribbean phenomena such as high levels of corruption, high income and wealth inequalities, and the relationships between large multinational corporations and economic sectors within each island upon which they are heavily dependent.

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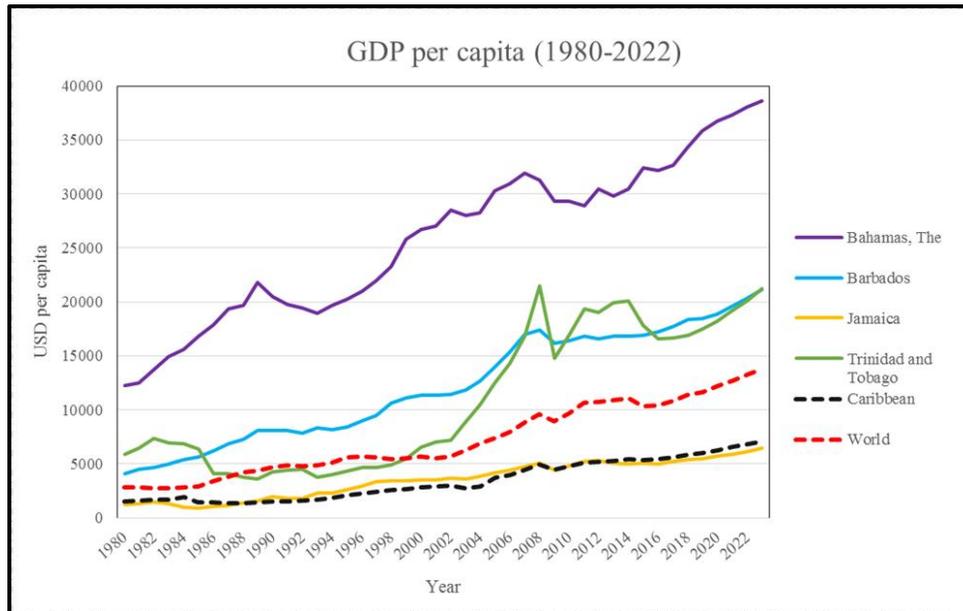
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Appendix:



Appendix 1, Figure 1: Gross Domestic Product (GDP) per capita by Country, The Bahamas, Barbados, Jamaica, Trinidad and Tobago 2001-2016

Calculating the HDI:

1. *Life Expectancy Index (LEI)* = $\frac{(LE - 20)}{(85 - 20)}$
2. *Educational Index (EI)* = $\frac{(MYSI + EYSI)}{2}$
 - *Mean Years of Schooling Index (MYSI)* = $\frac{MYS}{15}$
 - *Expected Years of Schooling Index (EYSI)* = $\frac{EYS}{18}$
3. *Income Index (II)* = $\frac{[\ln(GNIpc) - \ln(100)]}{[\ln(75000) - \ln(100)]}$
4. $HDI = \sqrt[3]{(LEI * EI * II)}$

Appendix 1, Table 1: Fixed Effects, Time Fixed Effects, and Time Fixed Effects using Robust Standard Errors OLS Panel Regression Results

| | (1) hdi100 | (2) hdi100 | (3) hdi100 |
|-----------------------|---------------------------|--------------------------|--------------------------|
| lagaid_pc1 | -0.000791 (0.0245) | -0.000132 (0.00968) | -0.000132 (0.00795) |
| laghomicides1 | 0.0235 (0.0285) | 0.00633 (0.0117) | 0.00633 (0.00792) |
| lagmaternalmortality1 | -0.261*** (0.0614) | -0.107*** (0.0285) | -0.107** (0.0273) |
| lagnetmigration1 | 0.0000801* (0.0000440) | 0.0000158 (0.0000209) | 0.0000158 (0.0000230) |
| laghiv1 | -4.028*** (1.425) | -1.388** (0.669) | -1.388 (0.908) |
| lagintl tourism1 | -0.104** (0.0490) | 0.00969 (0.0253) | 0.00969 (0.0277) |
| lagunemployment1 | 0.149* (0.0849) | -0.0818* (0.0410) | -0.0818* (0.0275) |
| lagtaxrevpercapdp1 | 0.590*** (0.124) | 0.144** (0.0533) | 0.144** (0.0253) |
| lagfdi1 | -5.04e-10* (2.76e-10) | 2.44e-10 (1.46e-10) | 2.44e-10 (1.46e-10) |
| lagaidinc1 | -9.94e-09 (1.70e-08) | -4.34e-09 (7.05e-09) | -4.34e-09 (8.70e-09) |
| 2002.year | | 0 (.) | 0 (.) |
| 2003.year | | 0.242 (0.354) | 0.242 (0.549) |

| | | | |
|----------------------------|---------------------------------|---------------------------------|----------------------------------|
| 2004.year | | 1.153 ^{***} (0.332) | 1.153 ^{**} (0.294) |
| 2005.year | | 1.460 ^{***} (0.335) | 1.460 ^{**} (0.361) |
| 2006.year | | 1.536 ^{***} (0.359) | 1.536 ^{***} (0.0880) |
| 2007.year | | 1.789 ^{***} (0.358) | 1.789 ^{***} (0.268) |
| 2008.year | | 2.255 ^{***} (0.355) | 2.255 ^{**} (0.613) |
| 2009.year | | 2.018 ^{***} (0.421) | 2.018 ^{***} (0.243) |
| 2010.year | | 2.570 ^{***} (0.349) | 2.570 ^{**} (0.456) |
| 2011.year | | 3.117 ^{***} (0.333) | 3.117 ^{***} (0.213) |
| 2012.year | | 3.840 ^{***} (0.351) | 3.840 ^{***} (0.266) |
| 2013.year | | 4.116 ^{***} (0.376) | 4.116 ^{***} (0.209) |
| 2014.year | | 4.134 ^{***} (0.373) | 4.134 ^{***} (0.123) |
| 2015.year | | 4.024 ^{***} (0.375) | 4.024 ^{***} (0.134) |
| 2016.year | | 3.741 ^{***} (0.384) | 3.741 ^{***} (0.378) |
| _cons | 92.24 ^{***} (8.459) | 80.70 ^{***} (3.969) | 80.70 ^{***} (4.491) |
| <i>N</i> | 60 | 60 | 60 |
| <i>R</i> ² | 0.590 | 0.965 | 0.965 |
| adj. <i>R</i> ² | 0.474 | 0.936 | 0.942 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$